

**CLAIMS**

1. A method of extruding a slab of dry ice from a source of liquid CO<sub>2</sub>, said method comprising the following steps:

blocking an extruding slot in a die at an end of a cylinder of a dry ice

extruding machine;

injecting said liquid CO<sub>2</sub> from said source into said cylinder of said dry ice

extruding machine to form gaseous CO<sub>2</sub> (snow) and solid CO<sub>2</sub> therein;

degassing said cylinder to remove gaseous CO<sub>2</sub> through vents from said

cylinder while forming said snow in said cylinder;

building a puck in said end of said cylinder having said extruding slot in said

die by moving a pressure piston back and forth in said cylinder of said dry ice

extruding machine during said injecting;

unblocking said extruding slot to allow dry ice to be extruded therethrough;

breaking said extruded dry ice upon the length thereof reaching a

predetermined distance to give said slab of dry ice; and

repeating said breaking step to create as many of said slabs of dry ice as

desired.

1       2. The method of extruding a slab of dry ice from a source of liquid CO<sub>2</sub> as recited  
2       in Claim 1, including after said unblocking step an additional step of sensing when  
3       said slab of dry ice being extruded has reached said predetermined distance to give a  
4       sizing control signal.

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6       3. The method of extruding a slab of dry ice from a source of liquid CO<sub>2</sub> as recited  
7       Claim 2, wherein said sizing control signal activates a sizing mechanism for said  
8       breaking of said slab of extruded dry ice into a predetermined length which  
9       corresponds with said predetermined distance.

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11      4. The method of extruding a slab of dry ice from a source of liquid CO<sub>2</sub> as recited  
12      in Claim 3, further including at the outer end of said extruding slot a forming  
13      chamber with a forming slot therein for receiving said slab of extruded dry ice  
14      therethrough, said forming slot allowing said slab of extruded dry ice to set before  
15      said breaking step.

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17      5. The method of extruding a slab of dry ice from a source of liquid CO<sub>2</sub> as recited  
18      in Claim 4, wherein said sizing mechanism moves a sizing block adjacent said  
19      forming chamber for said breaking of said extruded dry ice in said predetermined  
20      length.

1       6. The method of extruding a slab of dry ice from a source of liquid CO<sub>2</sub> as recited  
2       in Claim 5, wherein said sizing mechanism is pneumatically operated and said  
3       pressure piston is hydraulically operated.

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5       7. The method of extruding a slab of dry ice from a source of liquid CO<sub>2</sub> as recited  
6       in Claim 1, including a removable gate for said blocking and said unblocking of said  
7       extruding slot.

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9       8. The method of extruding a slab of dry ice from a source of liquid CO<sub>2</sub> as recited  
10      in Claim 7, wherein said removable gate is activated by a gate cylinder.

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12      9. The method of extruding a slab of dry ice from a source of liquid CO<sub>2</sub> as recited  
13      in Claim 8, wherein said removable gate is pressed against said extruding slot until a  
14      puck is formed in said cylinder.

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1       10. A die for connecting to an extrusion chamber of a dry ice extruding machine,  
2       said die being used to extrude dry ice therethrough from a source of liquid CO<sub>2</sub>, said  
3       die comprising:  
4                  generally rectangular shaped hole in said die for extruding dry ice from said  
5       condensing chamber of said dry ice extruding machine therethrough, said generally  
6       rectangular shaped hole being tapered for proper extrusion;  
7                  forming chamber having a similar generally rectangular shaped hole therein,  
8       said die and said forming chamber being adjacent, said forming chamber being of  
9       sufficient length to allow extruded dry ice to set up in a solid form in said similar  
10      generally rectangular shaped hole; and  
11                  means for attaching said die to an end of said extrusion chamber of said dry  
12      ice extruding machine.

1       11. A die for connecting to an extrusion chamber of a dry ice extruding machine,  
2       said die being used to extrude dry ice therethrough from a source of liquid CO<sub>2</sub> as  
3       recited in Claim 10, said die further including a block for removably blocking said  
4       similar oblong shaped hole until a puck has formed in said dry ice extruding  
5       machine.

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7       12. A die for connecting to an extrusion chamber of a dry ice extruding machine,  
8       said die being used to extrude dry ice therethrough from a source of liquid CO<sub>2</sub> as  
9       recited in Claim 11, wherein said die further includes a sizing mechanism for  
10      breaking off said extruded dry ice in predetermined lengths.

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12      13. A die for connecting to an extrusion chamber of a dry ice extruding machine,  
13      said die being used to extrude dry ice therethrough from a source of liquid CO<sub>2</sub> as  
14      recited in Claim 12, wherein said die further includes a sensor for determining when  
15      said extruded dry ice reaches said predetermined length to activate said sizing  
16      mechanism.

1       14. A dry ice extruding machine for extruding slabs of dry ice from a source of  
2       liquid CO<sub>2</sub>, a source of power connecting to said dry ice extruding machine, said dry  
3       ice extruding machine comprising:  
4              a frame;  
5              at least one extrusion cylinder mounted on said frame;  
6              a piston in said extrusion cylinder;  
7              connection of power from said source of power to said piston to cause back  
8       and forth movement of said piston in said extrusion cylinder;  
9              injection ports on said extrusion cylinder for injecting said liquid CO<sub>2</sub> into said  
10      extrusion cylinder and flashing said liquid CO<sub>2</sub> into gaseous and solid CO<sub>2</sub>;  
11              vents on said extrusion cylinder for venting said gaseous CO<sub>2</sub> from said  
12      extrusion cylinder;  
13              a die mounted on a first end of said extrusion cylinder, said die having a slot  
14      therein for extruding a slab of said solid CO<sub>2</sub> therethrough; and  
15              blocking device for blocking said slot until a puck has formed in said first end  
16      of said extrusion cylinder and thereafter removing said blocking device.

1       15. The dry ice extruding machine for extruding slabs of dry ice from a source of  
2       liquid CO<sub>2</sub> as recited in claim 14 wherein said connection of power is a hydraulic  
3       cylinder driving said piston through a second end of said extrusion cylinder.

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5       16. The dry ice extruding machine for extruding slabs of dry ice from a source of  
6       liquid CO<sub>2</sub> as recited in claim 15 wherein said dry ice extruding machine includes a  
7       sensor for determining if said slab has reached a predetermined length and  
8       generating a sizing control signal, said sizing control signal activating a sizing  
9       mechanism to break said slab into said predetermined length.

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11       17. The dry ice extruding machine for extruding slabs of dry ice from a source of  
12       liquid CO<sub>2</sub> as recited in claim 16 wherein said die further includes a forming chamber  
13       with a forming slot therein so that said slab can set before being broken into said  
14       predetermined length.

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16       18. The dry ice extruding machine for extruding slabs of dry ice from a source of  
17       liquid CO<sub>2</sub> as recited in claim 17 wherein said slot in said die and said forming slot in  
18       said forming chamber are tapered for proper extrusion.

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1       19. The dry ice extruding machine for extruding slabs of dry ice from a source of  
2       liquid CO<sub>2</sub> as recited in claim 16 wherein said sizing mechanism is a block that  
3       moves adjacent and parallel to an outer face of said forming chamber to break said  
4       slab into said predetermined length, said block being pneumatically operated.

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6       20. The dry ice extruding machine for extruding slabs of dry ice from a source of  
7       liquid CO<sub>2</sub> as recited in claim 14 wherein said blocking device is pressed on outer  
8       opening of said slot to prevent escape of CO<sub>2</sub> therethrough while forming said puck.